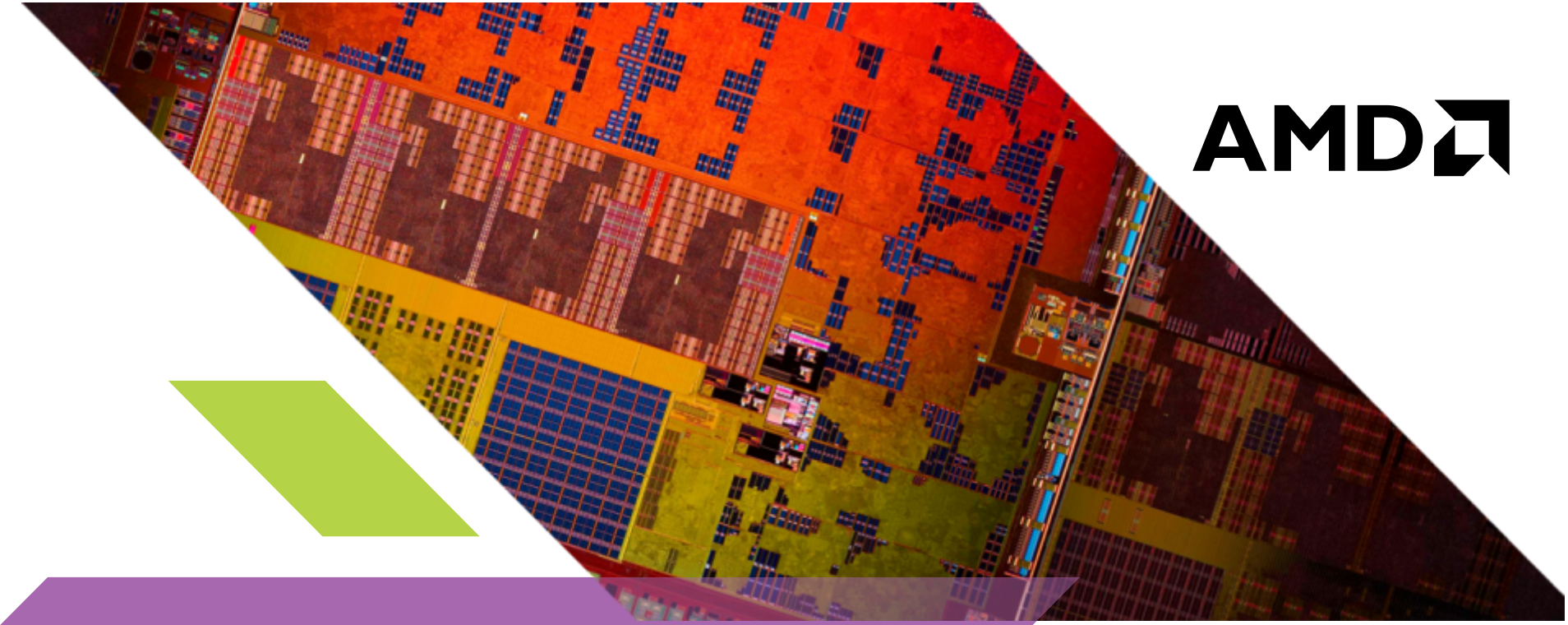

MOTIVATION AND STRATEGY FOR A NEW ABSTRACT MEMORY INTERFACE

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STANDARDS & INNOVATION

Memory systems are where the interesting key innovation will occur in the coming years

- A good standard enables innovation and significantly benefits the industry
- An overly restrictive standard stifles innovation
- An irrelevant standard is a waste of effort
  - Read Wikipedia article on the failure of Futurebus for a sobering example.

Goal:
Develop a high volume commercial standard that enables ongoing innovation and also meets the needs of exascale systems.

MOTIVATION BASED ON COMPANY TYPE

Memory Companies:

- Are *ALL* highly motivated to move up the value chain and produce something with value added IP.

Processor Companies:

- Want all value added IP to be on the processor chip, with memory remaining low-cost vanilla commodity parts
  - Have good experience and IP for optimizing memory controllers
- But cannot afford to design a new memory interface for every new memory technology and architecture coming down the pipeline

System Companies:

- Would like the flexibility to assemble unique value added systems

THE JEDEC STANDARDS PROCESS

- The ultimate endorsement for a high volume memory standard
- JEDEC is optimized for controlled incremental improvements
  - DDR4: 8 years from first presentation to first commercially available parts

- May never agree on a DDR5 standard
- But can it agree on a revolutionary new standard in any reasonable time?
  - Standards process first, or working parts first?

- How do we get key companies to view such a new standard as being in their *best business interest* ??

RELATION TO OTHER PROTOCOLS

Can we think of this as a follow-on extension to:

- IBM's CAPI effort
- AMD's Coherent Hyper-Transport
- Intel's QPI
- RapidIO

They are all trying to do some aspects of the same thing

What are the lessons to be learned from failed attempts:

- Futurebus
- Scalable Coherent Interface (SCI)

RELATION TO FAST FORWARD - 2

- AMD Press release on FF2 (in part):

  "…AMD will collaborate with the DOE *and others* to help define a new standard for memory interfaces that meets the needs of future-generation memory devices, including non-volatile memory and processing-in-memory (PIM) architectures…"

- Press releases from other companies are still pending

WHERE DO WE GO FROM HERE?

1. Define organizational goals, scope, membership, and plan
   for a study / advocates group
2. Learn lessons from past attempts at this
3. Define the technical goals, scope and high level outline of a new standard
4. ★ Work on developing buy-in from some key industry players ★
5. Get criticized in editorials in key industry magazines
6. Disrupt the entire computer ecosystem